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Abstract

STUDY OF TENDENCY TO BRITTLENESS OF FERRITE-PEARLITE STEELS FOR REACTOR VESSELS DURING NEUTRON IRRADIATION

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The report contains the results of studying the effect of neutron irradiation on the mechanical properties of low-carbon and low-alloy steels and their welded joints used for making power reactor vessels.

The effect of the integrated flux and temperature of irradiation on the tendency to brittleness and the effect of postirradiation annealing on the recovery of steel mechanical properties have been considered. Some regularities are cited showing dependency of steel strength and brittleness on irradiation conditions.

It is proved that steel strengthening caused by neutron irradiation depends not only on the temperature and dose of irradiation but also on steel composition.

The temperature of irradiation is stated to be the main factor determining the stability of properties of the irradiated samples.

The critical temperature of brittleness as measured during shock or static bendings is considered to be one of the basic characteristics for evaluation of safety operation of the reactor vessel material.

Theoretical evaluation of spectrum influence on steel strengthening is given. The product of multiplying numbers with "reduced density" by their effective size is considered to be a criterion of damage.

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